Material Safety Data Sheet

Martrex, Inc.

Section 1: Chemical Product and Company Information

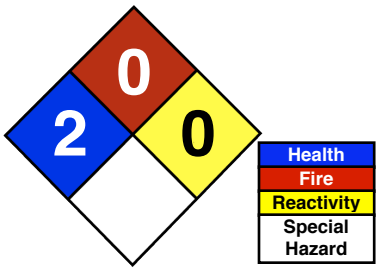
Product name: Zinc Sulfate
Reference Number: n/a
Supplier/ Further Information: Martrex, Inc.

P. O. Box 1709
14525 Highway 7
Minnetonka, Minnesota 55345-3793

Phone: 952/933-5000
Toll Free: 800/328-3627
FAX: 952/933-1889

Web: www.martrexinc.com

EPA Registration Number: n/a
CAS#: 7446-19-7
Chemical Name: Zinc Sulfate Monohydrate
Synonyms: Sulfuric acid zinc salt, monohydrate, White Vitriol, Zinc Vitriol
Chemical Family: Inorganic Salt
MSDS Number: n/a



For Rating Explanation see Section 16

24 Hour Emergency Phone - Chemtrec Transport: 1-800-424-9300; Medical: 1-800-441-3637

Section 2: Composition/Information on Ingredients

Component	SARA Listed Hazardous?	CAS#	%	RTECS#	Other Limits
1. Zinc Sulfate Monohydrate	Yes	7446-19-7	100%	ZH5270000	See Sections 11,12,15

Comp.	OSHA PEL	OSHA STEL	OSHA CEIL	ACGIH TLV	ACGIH STEL	ACGIH CEIL
1. (above)	15 mg/m³ 8-hr TWA (total); 5 mg/m³ 8-hr TWA (respirable)	no data	no data	10 mg/m³ (inhalable particulate); 3 mg/m³ (respirable particulate)	no data	no data

Section 3: Hazards Identification

Emergency Overview: Colorless, odorless granules. Not flammable or explosive, but will decompose in extreme heat to produce toxic sulphur oxide gas and zinc oxide fume. The granular solid or dust is relatively non-toxic to humans and poses little immediate hazard to emergency response personnel. However, it is freely soluble in water and can pose a threat to watercourses.

NFPA: Health: **2** Flammability: **0** Reactivity: **0**

Potential Health Effects: May irritate eyes, skin and respiratory tract. If dusty it may cause breathing difficulty and irritation of mucous membranes. Ingestion may cause strong stomach cramps and diarrhea and may induce spontaneous vomiting. Chronic health hazards include stomach irritation, abdominal cramps and nausea. Zinc sulfate monohydrate is not considered a carcinogen by OSHA, NTP, IARC, ACGIH or the EU (see Toxicological Information, Section 11).

Primary Routes of Exposure / Entry: Inhalation, Skin and Eye Exposure to generated dust and especially generated zinc oxide fume through thermal decomposition.

Target Organs: blood, cardiovascular system

Acute Exposure Symptoms

Inhalation (breathing): May cause irritation of the nasal membranes and upper respiratory tract, possibly severe. Significant exposures may result in difficulty breathing, low blood pressure, dizziness, bluish skin color and lung congestion.

Eye Contact: Contact may cause eye irritation including stinging, watering and redness.

Skin Contact: May cause irritation, possibly severe.

Ingestion (swallowing): May irritate or cause burns to digestive tract. Significant exposures may cause effects such as fever, nausea, vomiting, diarrhea, stomach pain, blood in the stool, inability to urinate, low blood pressure, kidney damage, liver damage and convulsions.

Chronic Exposure Symptoms: Continued and prolonged overexposure may result in digestive disorders, kidney and/or liver damage.

Medical Conditions Aggravated By Long-Term Exposure: Conditions aggravated by exposure may include skin disorders and respiratory (asthma-like) disorders.

Potential Environment Effects: This product is highly soluble in water and has the potential to be toxic to fish and other aquatic life. It also has the potential to be toxic to plant life and other terrestrial organisms at elevated concentrations in soils (see Ecological Information, Section 12).

Carcinogenicity Data:

OSHA: not listed **NTP:** not listed **IARC Monograph:** not listed **ACGIH:** not listed **EU:** not listed

Also See: Section 11 for more Toxicological information

Section 4: First Aid Measures

Inhalation: Remove from exposure area to fresh air immediately. If breathing is difficult, oxygen may be administered by a qualified operator. Keep person warm and at rest. **Get medical attention for irritation or any other symptom.**

Eye Exposure: Do not allow victim to rub eye(s). Flush with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding eyelid(s) open. **DO NOT attempt to manually remove anything stuck to the eye. Get medical attention immediately.**

Skin Exposure: Remove contaminated clothing, shoes, watches and belts immediately. Flush with lukewarm gently flowing water for 5 minutes. If irritation persists, repeat flushing. **Obtain medical advice**. Completely decontaminate clothing, shoes and leather goods before reuse or else discard. **Get medical assistance for irritation, burns or any other symptom.**

Ingestion: Never give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. **Do Not Induce Vomiting.** Have victim drink 2 – 8 oz. (60 ml – 240 ml) of water. Zinc sulfate is an emetic and may cause vomiting. If vomiting occurs naturally, have victim rinse mouth with water again. **Get medical attention immediately and bring a copy of this MSDS.**

NOTE TO THE PHYSICIAN: The decision as to whether the severity of poisoning requires administration of any antidote and actual dose required should be made by qualified medical personnel.

Section 5: Fire Fighting Measures

Flammability Classification: Zinc sulfate does not burn or support combustion.

Flash Point: none

Auto-ignition Temperature: not determined

Lower explosion limit (LEL): no data

Upper explosion limit (UEL): no data

Extinguishing Media: Use any standard agent suitable for surrounding structural fire or for other chemicals that may be involved.

Unusual Fire and Explosive Hazards: Product burns only with great difficulty but will decompose in the heat of a fire. Containers involved in a fire may rupture (possibly explosively) releasing decomposition products.

Hazardous Decomposition Materials: Thermal decomposition may include toxic and hazardous oxides of zinc and sulfur**.**

Fire-Fighting Instructions: When involved in an intense fire this product may thermally decompose at temperatures above about 600°C (1200°F), producing toxic fumes of sulfur dioxide gas. As with any fire, fire fighters should be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask. Do not use water directly on material as it is highly water soluble. Do not allow water run-off to enter sewers or watercourses.

Personal Protective Equipment: Fire fighters should be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask. Contain any liquid runoff.

Section 6: Accidental Release Measures

Procedure to be Followed in Case of Leak or Spill:

Spill and Leak Personal Procedures: Gloves and coveralls or other protective clothing are recommended for persons responding to an accidental release (see also Section 8). Close-fitting safety goggles may be necessary in some circumstances to prevent eye contact.

Containment of Spill: Prevent product spillage from entering drinking water supplies or streams.

Cleanup and Disposal of Spill: Control source of release if possible to do so safely. Clean up spilled material immediately observing precautions in Section 8, Personal Protection. Powder or dust should be cleaned up using methods that will minimize dust generation (e.g., vacuum solids or dampen material and wet sweep/shovel, etc.). Return uncontaminated spilled material to the process if possible. Place contaminated material in suitable containers for later recovery or disposal. Treat or dispose of waste material in accordance with all local, state/provincial, and national requirements.

Environmental and Regulatory Reporting: This product can pose a threat to the environment. Contamination of soil and water should be prevented. Keep spillage and runoff from storage areas from entering soil, streams or sewers.

Section 7: Handling and Storage

Handling and storage: Store in cool, dry, well-ventilated area away from incompatible substances. Protect from physical damage. It is good practice to keep container closed when not in use. Avoid generating dust and the release of dust into the workplace. Good housekeeping is important to prevent accumulations of dust. Always practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands after handling and before eating, drinking, or smoking in appropriate, designated areas.

REGULATORY REQUIREMENTS: See Section 2 and 8 for employee exposure controls and Section 15 for other regulatory requirements.

Section 8: Exposure Controls / Personal Protection

Ventilation Protection: Use adequate local or general ventilation where necessary to maintain the concentrations of zinc sulfate dust well below the recommended occupational exposure limits for general Particulates, Not Otherwise Specified (PNOS).

Respiratory Protection (specify type): Where dust or fumes are generated and cannot be controlled to within acceptable levels by engineering means, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R or P-95 particulate filter cartridge).

Eye Protection: Eye protection should be worn. When dust is generated, there is a potential that eye contact may occur.

Skin Protection: Gloves and long sleeved work clothes should be worn; Disposable coveralls are necessary when there is large scale use of this product.

Hygienic Work Practices: Clean protective equipment before reuse. Wash after handling. Wash clothing and clean shoes before reuse. Disposable coveralls may be necessary.

Section 9: Physical and Chemical Properties

Chemical Name: Zinc Sulfate Monohydrate
Percent Equivalent: $ZnSO_4 \cdot H_2O$**:** 100%
Physical State: Solid
Color and Appearance: White powder or granules
Odor: no odor
Odor Threshold: no data
pH: ~ 4.5 @ saturated solution
Specific Gravity: (water=1)**:** 3.28
Vapor Pressure: negligible @ 20ºC (68º F)
Vapor Density: not applicable
Density: no data
Bulk Density: no data
Volatiles by Volume: no data
Boiling Point: no data
Melting/Freezing Point: Loses water at 238ºC (460ºF); Decomposes at 680ºC (1256ºF)
Crystallization Point: 21ºC (70º F)
Evaporation Rate: no data
Solubility in water: 53.8 g/100 ml at 20ºC (68ºF); 89.5 g/100 ml at 100ºC (212ºF)
Viscosity: no data
Other Solubilities: no data
Chemical Formula: $ZnSO_4 \cdot H_2O$
Formula Wt: 179.5

Section 10: Stability and Reactivity

Chemical Stability (under normal conditions of storage, handling, use)**:** Stable__X__ Unstable____
Hazardous Polymerization: May Occur____
Will Not Occur__X__
Conditions to Avoid: Avoid excessive heating that may lead to decomposition of the material.
Chemical Incompatibility and Materials to Avoid: None have been identified to date.
Hazardous Decomposition Products: High temperature operations such as oxyacetylene cutting, electric arc welding or severe overheating will generate zinc oxide fume which, on inhalation in sufficient quantity, can produce metal fume fever. Under such conditions, sulfur dioxide will also be generated and can cause respiratory distress.

Section 11: Toxicological Information

Acute Data: The major route of exposure would be through the generation and inhalation of airborne dust and especially the generation of zinc oxide fume through thermal decomposition.

Eye and Skin Effects: Direct contact may cause local irritation of the eyes or skin. Eye contact with solutions (>1%) may cause the appearance of white flecks on the lens of the eye. Dust or fume from burning or welding operations may also cause local irritation.

Inhalation: Acute inhalation may result in irritation but is not expected to cause significant harmful effects. Symptoms may include discomfort, coughing, tingling sensation, sneezing and/or shortness of breath and wheezing. Extreme heating of zinc sulfate monohydrate will generate zinc oxide fume. If inhaled, this fume can result in the condition called metal fume fever. The symptoms of metal fume fever will occur within 3 to 10 hours of exposure, and include immediate dryness and irritation of the throat, tightness of the chest, and coughing which may later be followed by flu-like symptoms of fever, malaise, perspiration, frontal headache, muscle cramps, low back pain, occasionally blurred vision, nausea, and vomiting. The symptoms are temporary and generally disappear, without medical intervention, within 24 to 48 hours of onset. There are no recognized complications, after affects, or chronic affects that result from this condition.

Ingestion: Ingestion of large doses can cause anemia and stomach symptoms. Zinc sulfate is very astringent, and when ingested in excessive quantities, can irritate the stomach, resulting in abdominal pain, nausea, diarrhea and spontaneous vomiting.

Acute Oral LD50 / LC50: Rat, oral LD50 – 1,538 mg/kg (for anhydrous/)

Chronic Data

Potential Chronic Effects: Continued and prolonged overexposure may result in digestive disorders, kidney and/or liver damage.

Carcinogenicity Data:

NTP: Not listed **OSHA:** Not listed **IARC Monograph:** Not listed **ACGIH:** Not listed **EU:** Not listed

Other Effects on Humans: no data

Section 12: Ecological Information

Eco-acute Toxicity:

EPA Ecological Toxicity rating: no data

Acute Toxicity to Fish: no data

Aquatic Organism Toxicity: Zinc, in particular, may be toxic to aquatic organisms, especially fish, at elevated concentrations; water hardness, pH and dissolved organic carbon concentrations are significant regulating factors in zinc toxicity.

Chronic Toxicity to Fish: Zinc may be toxic to fish, at elevated concentrations

Acute Toxicity to Aquatic Invertebrates: no data

Acute Toxicity to Aquatic Plants: no data

Toxicity to Bacteria: no data

Toxicity to Soil Dwelling Organisms: no data

Toxicity to Terrestrial Plants: no data

Environmental Fate:

Stability in Water: This product is highly soluble in water. Its zinc contents are directly bioavailable.

Stability in Soil: In terrestrial environments, the mobility of both zinc and manganese in soil, and their degree of bioaccumulation in organisms depends on the chemical characteristics of the soil.

Toxicity: no data

Section 13: Disposal Considerations

Disposal Procedures: Do not wash down drain. Put uncontaminated material back into the process if at all possible. Place contaminated material in suitable, labeled containers for disposal. Dispose of waste material consistent with the requirements of waste disposal authorities.

RCRA Hazardous Waste Number: no data

Best demonstrated available treatment: no data

Container Cleaning And Disposal: no data

Disposal Regulatory Requirements: Consult local or state environmental regulatory agencies for acceptable disposal procedures and locations.

Section 14: Transport Information

Transport Canada Classification: Not regulated

US DOT Hazard Classification: Class 9, Packing Group III (RQ)
(Regulated only if transported in containers containing 1,000 (RQ) or more lbs. of zinc sulfate.)

Shipping Name U.S. DOT: Environmentally Hazardous Substance, Solid, n.o.s. (contains Zinc Sulfate)

DOT Reportable Quantity: 1000 lbs. per container

US DOT Product Identification Number: UN3077

Marine Pollutant (US): No

IMO Classification: Not regulated

Section 15: Regulatory Information

TSCA Listed?: Yes
DSL (Canadian)**:** Yes
WHMIS Classification not a controlled product.
EPA Regulations:
TSCA 8(b) inventory: Zinc Sulfate Monohydrate
RCRA Hazardous Waste Number: no data
CERCLA Hazardous Substance: Zinc Sulfate
CERCLA Reportable Quantity: 1,000 lbs.
SARA 311/312 Codes: None
SARA (Hazard Categories Title III rules): User should contact local and state regulatory agencies for information on additional or more stringent reporting requirements.
SARA 313 Toxic Chemical: Zinc Compounds (Zinc Sulfate)
CAS No. 7446-19-7
Percent by Weight 100%
SARA 302 EHS: no ingredients qualify.
SARA 302 EHS Threshold Planning Quantity: no data
OSHA Regulations: This material is considered to be hazardous as defined by the OSHA Hazard Communication Standard. (29 CFR 1910.1200).
OSHA: PEL = 15 mg/m^3 8-hr TWA (total); 5 mg/m^3 8-hr TWA (respirable)
ACGIH: TLV = 10 mg/m^3 (inhalable particulate); 3 mg/m^3 (respirable particulate)
State Regulations: Since state and local laws vary, consult your attorney or appropriate regulatory officials for information relating to spill reporting.

Section 16: Other Information

ACGIH - American Conference of Governmental Industrial Hygienists
ANSI - American National Standards Institute
CAS - Chemical Abstracts Service
CERCLA - Comprehensive Environmental Response, Compensation & Liability Act of 1980
CFR - Code of Federal Regulations
CHEMTREC - Chemical Transportation Emergency Center
DOT - U.S. Department of Transportation
DSL - Canadian Domestic Substance List
EHS - Extremely Hazardous Substance
EPA - U.S. Environmental Protection Agency
HMIS - Hazardous Material Identification System
IARC - International Agency for Research on Cancer
LEL/UEL - Lower and Upper Explosive Limit

NFPA Rating Explanation Guide

Rating Number	Health Hazard	Flamibility Hazard	Instability Hazard
4	Can be lethal	Will vaporize and readily burn at normal temperatures	May explode at normal temperatures and pressures
3	Can cause serious or permanent injury	Can be ignited under almost all ambient temperatures	May explode at high temperature or shock
2	Can cause temporary incapacitation or residual injury	Must be heated or high ambient temperature to burn	Violent chemical change at high temperatures or pressures
1	Can cause significant irritation	Must be preheated before ignition can occur	Normally stable. High temperatures make unstable
0	No Hazard	Will not burn	Stable

Rating Symbol	Special Hazard
ALK	Alkaline
ACID	Acidic
BIO	BioHazard
COR	Strong Corrosive
CRYO	Cryogenic
OXY	Oxidizer
☢	Radioactive
W	Reacts violently or explosively with water
W OX	Reacts violently or explosively with water or oxidizer

This chart for reference only - For complete specifications consult the NFPA Standard

24 Hour Emergency Phone - Chemtrec: 1-800-424-9300 Transportation
1-800-441-3637 Medical

mg/m³ - Milligrams per cubic meter
MSDS - Material Safety Data Sheet
NAERG - North American Emergency Response Guidebook
NIOSH - National Institute of Occupational Safety and Health
NFPA - National Fire Protection Association
NTP - National Toxicology Program
OSHA - Occupational Safety and Health Administration
PEL - Permissible Exposure Limit (set by OSHA)
PPE - Personal Protective Equipment
RCRA - Resource Conservation and Recovery Act of 1976
SARA - Superfund Amendments and Reauthorization Act
TDG (Canadian)**:** Transport of Dangerous Goods Regulations
TLV - Threshold Limit Value (set by ACGIH)
TWA - 8-hour Time Weighted Average
TSCA - US Toxic Substance Control Act
WHMIS - Workplace Hazardous Material Information System

MSDS Issue Date: n/a
Revised Date: 2-11-10
Supersedes: n/a

Disclaimer: Martrex, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. **MARTREX, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MARTREX, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.**